From design to fabrication in a few minutes

Mrs. Esther Moll, KaVo application technician and dental technician, presents a design made with the ARCTICA-Software package

By Mrs. Esther Moll

The DentalDataBase user interface (Figure 1) shows all individual steps, from order creation, scanning, design to data transfer to the milling machine. To illustrate the rapid and simple realization of a design, the description of the "step-by-step wizard" contains the time code. Tooth 24 is to be supplied with a crown. Design inputs are the current situation (Figure 2) and the mirror tooth 11. The impression of the current situation is taken and the scanned data are stored. The tooth is prepared, the impression is scanned.

02:25 p.m. - Data are stored.
02:26 p.m. - Data of the prepared 24 and the impression of the current situation is uploaded. The crown is positioned on the prepared stumps (Figure 3).
02:27 p.m. - The step-by-step wizard leads to the next step of the process. The preparation line is created by the software via "1-click" (Figure 4).
02:28 p.m. - The software shows the calculated restoration shape (stump, Figure 5). This proposal by the software could still be individualized or changed.
02:29 p.m. - Mesial and distal contact points (Figure 6) are set.
02:30 p.m. - The software has positioned the database tooth (Figure 7).
02:30 p.m. - The step-by-step wizard offers to adapt the database tooth (white) to the situation (turquoise). The process step in the box (right) is called “Adaptation of model teeth”. The software calculates the correction (Figure 8).
02:50 p.m. - Adaptation of the design is complete (Figure 9).
02:51 p.m. - This process step (Figure 10) would allow additional changes or corrections. Proceed to the next process step with the “Continue” button.
02:51 p.m. - The system offers to trim the antagonist (purple) (Figure 11). Contact points to the adjacent teeth can be created or reduced.
02:53 p.m. - The MultiCAD software package now calculates the anterior tooth crown, completes the data and generates the milling data (Figure 12).

From now on the order for milling the crown can be issued. Access the “KaVo Software Suite” via the “CAM” button in the DentalDataBase. This controls the engine. Use the start menu to select fabrication job and tool magazine and complete the order (Figure 13).

Figure 1: The DentalDataBase
Figure 2: Initial situation and definition of target situation
Figure 3: Calculated restoration shape
Figure 4: Positioning
Figure 5: Calculated restoration shape
Figure 6: Contact point
Figure 7: Software places a database tooth
Figure 8: Correction of database tooth
Figure 9: Adaptation of database tooth
Figure 10: Query for further adaptation requests
Figure 11: Trimming the antagonist
Figure 12: Crown calculated – ready for fabrication
Figure 13: The “KaVo Software Suite”

Dental technician Esther Moll has been an application technician with KaVo Dental since 1 October 2007 and works with KaVo Everest and KaVo Arctica. During product pilot phases, she acts as expert contact person for verifications, correction of bugs, software tests, etc. In addition, she Complaint manager and works for international support. On the occasion of her user report, DZW spoke to Esther Moll about the particularities of KaVo’s Arctica System.

Q: Ms Moll, for a crown design to take barely ten minutes as described in the example, is this achievable for absolute Arctica professionals only?

Esther Moll: Anyone who has sufficient knowledge to define a crown by its key anatomic features can do that. With a little practice “simple” individual crowns can be done in five minutes – and this despite the five-axis technology, which is capable of fabricating even complex shapes. We are working on process optimizations that could lead to process times of ten minutes.

How much space will I have to allow for an Arctica system in my lab? Is a tabletop sufficient?

Yes, a big advantage is its size - half a technician’s bench is easily sufficient. The Arctica Engine’s dimensions of 30 1/2 x 25 1/4 x 25 inch (775 x 500 x 584 millimeters) and its installation depth of 20 2/5 ince (524 millimeters) are indeed very compact.

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"With a little practice “simple” individual crowns can be done in five minutes”

In the interview below with KaVo’s, dental technician Esther Moll discusses the ARCTICA System’s further possibilities.

By KaVo

That is of course possible. The Arctica system features open architecture and is modular. There is the option to start with a scanner and CADSoftware and share designed parts through the system’s web portal with a lab or dental surgery that uses an Arctica or Everest machine and have them fabricated there.

Which file formats can the multiCAD software handle?

The multiCAD-Software can handle all STL files that are not encrypted.

... and which materials can KaVo’s Arctica process? Are materials for temporary works being offered?

All that is possible. The range of materials includes not one but a number of ceramic materials. That includes of course the high performance ceramic zirconium oxide, but also Vita Mark II with its more than 20 years of clinically proven track record in various options including multi-colored blocks. There is, moreover, the option to process titanium, a material especially attractive for implant restorations and with many possibilities. The program also includes various plastics. Vita CAD-Temp is designated for temporary parts; in addition the glass-filled high performance polymer C-Temp with its bending strength of 500 Megapascals is available for long-term temporary parts. And finally there are C-Cast plastic or easy to mill waxes for use in conventional casting technology.

The design of a single crown takes barely ten minutes. How long does the subsequent grinding process take in KaVo’s Arctica-Engine?

At the moment, a single crown is done in approximately 20 minutes – and this despite the five-axis technology, which is capable of fabricating even complex shapes. We are working on process optimizations that could lead to process times of ten minutes.

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